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SALES hereby certify that annexed is a true copy of the Provisional specification
in connection with Application No. PS 0165 for a patent by GREG HILL as filed
on 25 January 2002.

WITNESS my hand this
Third day of February 2003

A handwritten signature in cursive script, reading "J. Billingsley".

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
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PATENTS ACT 1990

PROVISIONAL PATENT APPLICATION

I **GREG HILL**

of **409d Mount Browne Road, Coffs Harbour, NSW 2450 Australia**

hereby apply for a patent in respect of my invention entitled:

Mooring Pontoon

The application is accompanied by the following:

- a) provisional specification
- b) informal drawings
- c) the prescribed fee of \$80.

The inventor's name and address are as follows:

Greg Hill

of **409d Mount Browne Road, Coffs Harbour, NSW 2450 Australia**

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Dated this 25th day of January 2002

**GREG HILL
By his Patent Attorneys**

WALSH & ASSOCIATES


JOHN WALSH F.I.P.T.A.

SWING MOORING PONTOON

BACKGROUND

The present invention relates to boat moorings and more particularly relates to improvements in swing moorings suitable for moorings which require a 360 degree sweep thereabout. More particularly the invention relates to a simple swing mooring which enables mooring of two boats abreast but within the same area normally required by one boat.

PRIOR ART

Moorings of boats in public waterways is becoming an increasing problem due to the limitations on available space. Typically boats are moored in marinas or on swing moorings. The invention to be described herein relates to the latter type of moorings. Swing moorings which are usually found in rivers harbours, estuaries, inlets and the like are provided by maritime authorities for lease or purchase by boat owners. A swing mooring will typically comprise a heavy weight such as a concrete block bearing on the sea or river bed a chain connected at one end to said weight and at an opposite end a float on the surface of the water. The chain may be connected directly to the float or to a length of rope which is connected to the float. The length of rope allows a crew member to more conveniently pull the float to the vessel for securing to the anchorage. When the boat is connected to a swing mooring it must have 360 degrees of clearance to swing to face the prevailing wind direction. This means that each boat moored in this way will take up a large area and in locations where hundreds of boats are to be moored this will put limitations on the number of moorings to the point where for a given water area there will be a finite number of moorings. In some waterways there are long waiting lists for swing moorings which are normally leased or bought from the local maritime authority. Moorings are a source of revenue for the government, thus it follows that if the number of moorings per unit area and thus boats per unit area could be increased, not only would there be more mooring space available for boat owners, there would also be a source of increased revenue for the government. There are a variety of mooring devices and apparatuses for mooring boats at jetties, wharves, pontoons and the like. The known

systems and devices may be divided into two categories. The first relates to those devices that are used for connecting a boat to its mooring and the second relates to the mooring itself.

As an example of the first category, US patent 6,213,017 discloses a device for mooring a boat has an elongate handle with proximal and distal ends. The distal end has an eyelet. A flexible mooring line with a first end is joined to the eyelet and a second end is adapted to join to the boat. The line extends through the eyelet and about an exterior of the handle member to the proximal end to form a loop at the distal end. The size of the loop can be adjusted by feeding more or less of the line through the eyelet. A flexible retaining line is joined to the proximal end and adapted to join to the boat.

As an example of the second category, US 6,105,530 discloses a floating wharf or pier for boat for ship mooring, comprising a body having a hollow structure defining at least one floatation chamber, said at least one floatation chamber being accessible from outside and defining a storage compartment and an upper admittance hatch member through which said at least one storage compartment is accessible.

US patent 6,273,016 discloses a portable assembly for supporting a watercraft in relation to a surface flooring of a body of water. The assembly includes a support member for supporting the watercraft and an engaging member adapted to be connected to the support member to selectively retain the watercraft in relation to the support member. A securing assembly is operably connected between the support member and the watercraft to provide a compressive loading force therebetween. Preferably, the support member is formed of a substantially rigid construction. The engaging member is adapted to receive the support member in engagement therewith and may be configured to pivotally engage the watercraft. The securing assembly is moveable between a first position and a second position, thus converting a portion of the weight of the watercraft into a compressive load on the support member. The apparatus for supporting a watercraft may also include a retaining member disposed in relation to the support member. The retaining member

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helps to resist slippage of the support member in relation to the surface flooring of the body of water, when the securing member is disposed in the second position.

US patent 6,062,158 discloses a Vessel mooring device. The device is a simple and yet efficient device for mooring vessels that floats up and down with the tide on vertical piling which maintains both ends of a mooring line at approximately the same height from the water. This is accomplished by providing a stainless steel cage with upper and lower rings with interior diameters larger than the diameter of the piling. These rings are connected by a plurality of risers. A bail or other securing means is used to secure the end of a mooring line. A bend is provided in each of the risers near the bottom ring so that the risers project outwardly. A floating means having an interior diameter smaller than the diameter of a plane passing through the bends in the risers is slipped over the lower ring and wedges on the risers so that the mooring device can rise and fall with the tide.

US Patent 5,832,861 discloses a boat docking or mooring apparatus having an elongated tubular housing wherein the housing is adapted for positioning between a boat and a dock while providing positive control in two directions. Adjacent each end of the housing a pin is utilized to secure an elongated helical spring within the housing. End caps, each including a pair of spaced apart cable guiding apertures, are provided at each end of the housing. At one end of the housing, a cable, looped through the apertures in an end cap, engages the elongated spring within the housing. In a similar manner, another cable is looped through the apertures of the other end cap and engages the other spring within the housing. In use, either cable is suitable for convenient attachment to a boat cleat or to a dock cleat. During operation, the combination of spring, cables and cable guiding end caps cooperate to dampen sudden boat movements and, even under adverse conditions, to transfer loads away from the spring and cables by achieving a slow load transfer, thereby stabilizing the boat and preventing damage to boat and dock.

US Patent 5,988,087 discloses a pontoon for a boat including a base member and a closure member which are attached to form a U-shaped performance structure and a cylindrical support structure. A foam filled nose cone is connected to front ends of the base member and closure member, and an end cap is connected to the back ends thereof

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to form an air tight chamber in the support structure. The pontoon is connected to a deck of the boat, so that the pontoon contacts the deck along the entire length of the pontoon. None of the prior art devices identified disclose a swing mooring capable of anchoring two vessels side by side such that the radial float area required is the same as the float area for a single vessel.

INVENTION

The present invention seeks to provide an improved swing mooring which increases the number of available moorings per unit area in a simple and efficient manner. More particularly the present invention relates to a module for a swing mooring which enables safe mooring of two vessels in an area which would previously have accommodated only one vessel.

According to one aspect, the mooring comprises a pontoon configured to enable two vessels to be moored side by side and including an area between the vessels which allows a person to walk between the vessels.

In one broad form the present invention comprises;
a swing mooring for enabling the anchorage of two boats therefrom; the mooring comprising a floating element having a leading end and a trailing end,
intermediate said leading end and said trailing end a spacing element located between said boats to keep said boats spaced apart but disposed in substantially the same orientation; wherein the mooring allows both boats to rotate within the same 360 circumference subtended from said float.

According to a preferred embodiment, the spacing element includes opposing faces each of which engage one of said boats.

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Preferably said mooring allows both boats to face the prevailing wind direction contemporaneously.

In another broad form the present invention comprises;

a twin berth swing mooring comprising a mooring element arranged to be connected to a mooring anchorage at or near a leading end and including a spacer to separate two adjacent boats connected to said mooring; the element including opposing side faces which each engage one said boats so that said boats are oriented in substantially the same direction.

Preferably, said boats are connected to said mooring element in spaced apart but parallel relationship.

In another broad form the present invention comprises;

a module for use as a swing mooring for enabling the anchorage of two boats thereto; the module being adapted for floatation and including a leading end and a trailing end, intermediate said leading end and said trailing end a spacing element located between said boats to keep said boats spaced apart but disposed in substantially the same orientation; wherein the module allows both boats to rotate within the same 360 circumference subtended from said float.

In another broad form the present invention comprises;

a swing mooring for enabling the anchorage of two boats therefrom; the mooring disposed radially of an anchorage and subtended by a sea bed weight; the mooring comprising a floating element having a leading end and a trailing end, intermediate said leading end and said trailing end a spacing element located between said boats when said boats are connected to said mooring to keep said boats spaced apart but disposed in substantially the same orientation; wherein the mooring element is subtended from a centre position defined by said weight.

In another broad form the present invention comprises:

a flotation buoy for use as a swing mooring and capable of retaining two boats at the same time; the buoy comprising a generally T shaped body including a leading end and a trailing end, wherein the leading end comprises a head which is connected to a tether

such as a rope, webbing or chain and the trailing end is free to move in a 360 degrees arc; wherein intermediate said leading end and said trailing end there is provided an arm having opposing outer surfaces which are continuous with a corresponding surface on said head to define recesses either side of said arm which each receive a boat hull; wherein said boat hulls are tied to said arm via cleats located thereon and provide spacing between said boat hulls so as to prevent unwanted contact between said boat hulls and wherein said boat hulls when connected to said arm are disposed in generally the same windward direction such that both boats are able to rotate in unison in an arc 0 – 360 degrees.

DETAILED DESCRIPTION

The present invention will now be described in more detail according to a preferred but non limiting embodiment and with reference to the accompanying illustrations wherein:

- Figure 1 shows a perspective plan view of a swing mooring element according to one embodiment of the invention.
- Figure 2 shows a plan view of the mooring element of figure 1;
- Figure 3 shows a side elevation of the mooring element of figure 1
- Figure 4 shows a leading end elevation of the mooring element of figure 1
- Figure 5 shows a perspective view of a typical mooring according to one embodiment with two boats attached.
- Figure 6 shows a front perspective view of the mooring pontoon showing spreader plate and straps (webbing) to underside of swing mooring pontoon;
- Figure 7a shows an elevation view of a spreader plate according to a preferred embodiment;
- Figure 7b shows a top view of the plate of figure 7a; and
- Figure 7c shows a side view of the plate of figure 7a;
- Figure 8 shows a plan view of a mooring line configuration according to one embodiment;

- Figure 9 shows an end view of the arrangement of figure 8;
Figure 10 shows a side view of the arrangement of figure 8;
Figure 11 shows a perspective view of the arrangement of figure 8 with chain to anchor attached.
Figure 12 shows a perspective view of a spreader plate with webbing.

Referring to figure 1 there is shown a perspective plan view of a swing mooring element 1 according to one embodiment. Element 1 which is adapted for flotation includes a leading wide head region 2 and a trailing arm 3. Head 2 is attached to a chain or rope (not shown) for anchoring the element to a submerged weight. Trailing part 3 is preferably elongated and includes opposing faces 4 and 5. Face 4 is continuous with face 6 which is disposed at an angle to face 4 to form a recess 7 which accommodates therewithin part of a boat structure. Likewise, face 5 is continuous with face 8 which is disposed at an angle to face 5 and forms recess 9 to accommodate at least part of a boat structure. Trailing arm 3 acts as a spacer to keep apart adjacent boats which will be moored in recesses 7 and 9. Upper surface 10 of arm 3 includes horn cleats 11 which receive tie lines from boats to be moored thereto.

Figure 2 shows a plan view of the mooring element of figure 1. Figure 3 shows a side elevation of the mooring element of figure 1 and Figure 4 shows a leading end elevation of the mooring element of figure 1

Figure 5 shows a perspective view of a typical mooring element 20 according to one embodiment with two boats 21 and 22 attached. In a typical arrangement, mooring element will be retained by an undersea anchorage which enables the element to move in a 360 degree circumference. Mooring element 20 will generally (where there is minor current flow) point to windward but the wind direction will dictate its compass direction. Known swing moorings provide for attachment of only one boat and although it might be conceivable that two boats could be connected to one mooring this would be entirely impractical as there are no satisfactory means for separating the craft to prevent lateral impact damage which would be occasioned by strong winds and rough waters. Mooring element 20 includes arm 23 providing separation between boats 21 and 22.

Mooring element 20 thus allows mooring of two boats in substantially the same water area previously taken up by single swing moorings. The configuration of the swing moorings is such that loads and stresses normally applied to a boat hull particularly at the bow will be spread over the part of the boat most able to withstand such stresses. Mooring 20 may be constructed from a variety of materials including plastics, concrete, metal, composite, wood or any material capable of floatation but sufficiently strong to be capable of withstanding lateral impact loads and possible crush loads imposed by concurrent heaving against arm 23. According to one embodiment, mooring element 20 is manufactured in a mold from plastics, concrete or compound rubber. Alternatively the mooring element is manufactured by constructing a space frame of a predetermined shape and applying to the finished space frame a water tight cladding to ensure maintenance of buoyancy.

Modifications may be made to the pontoon according to required changes in buoyancy, stability displacement and strength. The size may be varied to accommodate various designs for vessels of different sizes. According to one embodiment the mooring will accommodate vessels the majority of which fall within the 5.0m – 12m range, but it will be appreciated that the mooring may be adapted to accommodate vessels of sizes outside that range. The mooring will typically include fenders, customised to conform to the contour of the hull, horn cleats, bollards, hatches mooring lines. Vessels are typically attached to pontoon moorings via use of mooring lines to bollards and horn cleats or other attachments fixed to the deck of the pontoon.

Figure 6 shows a front perspective view of a mooring pontoon 30 with underside mooring straps 31 attached via connections 32, 33, 34 and 35. The connections are located to optimise stability of pontoon 30 and strength to spread applied load. Mooring lines 31 terminate at a spreader plate 37 or at a spreader bar (not shown). Spreader plate 37 used with webbing is intended to eliminate galvanic corrosion between the pontoon and anchor chain. This is particularly important when the pontoon is made of alloy.

Figure 7a shows an elevation view of a spreader plate 40 according to a preferred embodiment. Plate 40 includes outer frame 41 including slots 42 and 43 which receive anchor ropes or locking straps. Plate 40 further comprises a pad eye 44 and swivel 45. Pad eye 44 may be used to attach a springer or safety chain. Swivel 45 includes an eyelet

46 which receives an anchor chain (not shown). Figure 7b shows a top view of the plate of figure 7a and Figure 7c shows a side view of the plate of figure 7a.

Figure 8 shows a plan view of a mooring line configuration according to one embodiment.

The pontoon may be attached to a mooring chain from front bollards on the pontoon deck in accordance with current practice but mooring from the underside eliminates the possibility of running over the chain.

Figure 9 shows an end view of the mooring line arrangement of figure 8. Figure 10 shows a side view of the arrangement of figure 8 and Figure 11 shows a perspective view of the arrangement of figure 8 with chain to anchor attached and anchor ropes. The arrangements of figures 8-11 adopt a spreader bar 50 which distributes connection points for anchor ropes. Spreader plate 40 may be used or a spreader bar both providing a strong connector for the anchor chain and anchor ropes.

There are numerous advantages associated with the use of the swing mooring according to the invention herein described. The major advantage is that it allows two vessels to be moored in an area that currently accommodates only one vessel. This enables two vessels to be moored in half the area they would previously have required with the known swing moorings. The radius of swing may be reduced thereby providing a greater area for navigation between moorings and moored boats. The swing mooring pontoon can reduce damage to a sea bed environment such as sea grasses. The mooring also allows boat maintenance to be carried out without having to move the boat to a wharf or slipway, due to access provided by the mooring. The moorings also provide a buffer in rough conditions and a separation for each vessel. There are also economic advantages which include savings on annual inspection fees for mooring apparatus and increased revenues per unit area from the additional mooring sites.

It will be recognised by persons skilled in the art that numerous variations and modifications may be made to the invention as broadly described herein without departing from the overall spirit and scope of the invention

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Dated this 25th day of January 2002

GREG HILL

By his Patent Attorneys

WALSH & ASSOCIATES

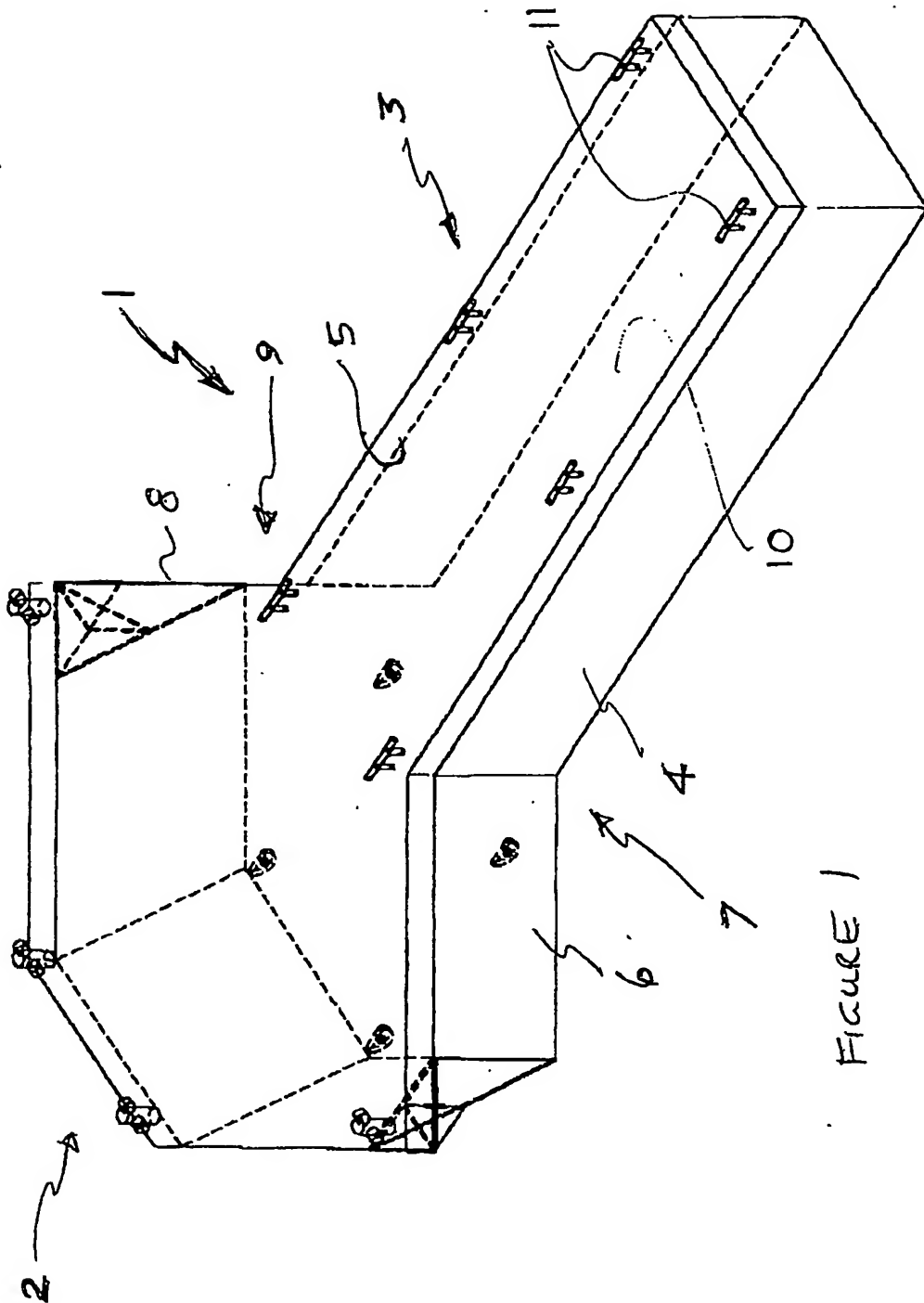


FIGURE 1

3D VIEW SWING MOORING PONTOON

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P. 13
P. 13

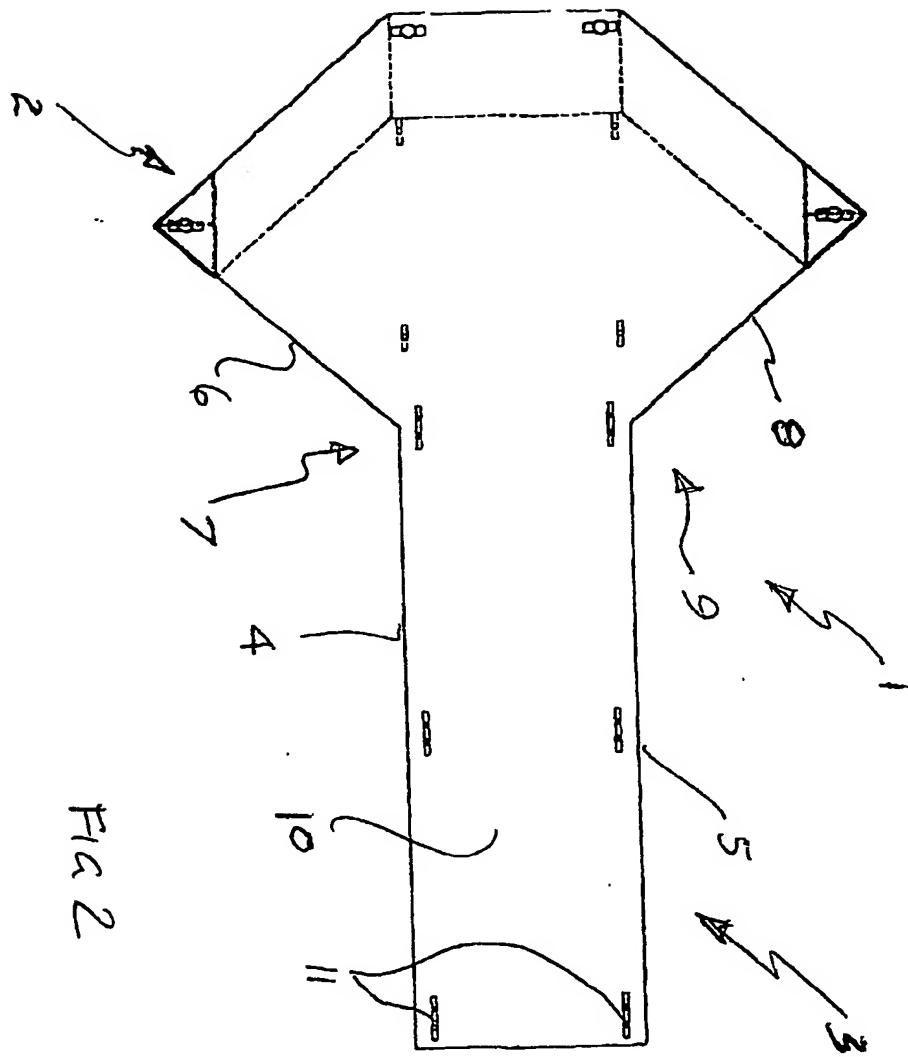


FIG 2

PLAN VIEW
SWING MOORING PONTOON

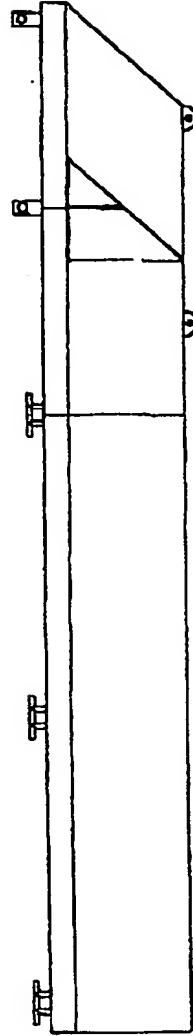


FIG 3

SIDE VIEW
SWING MOORING PONTOON

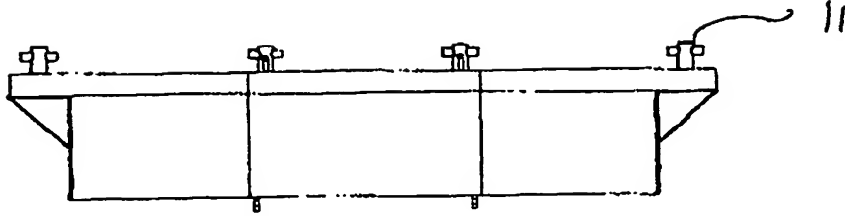
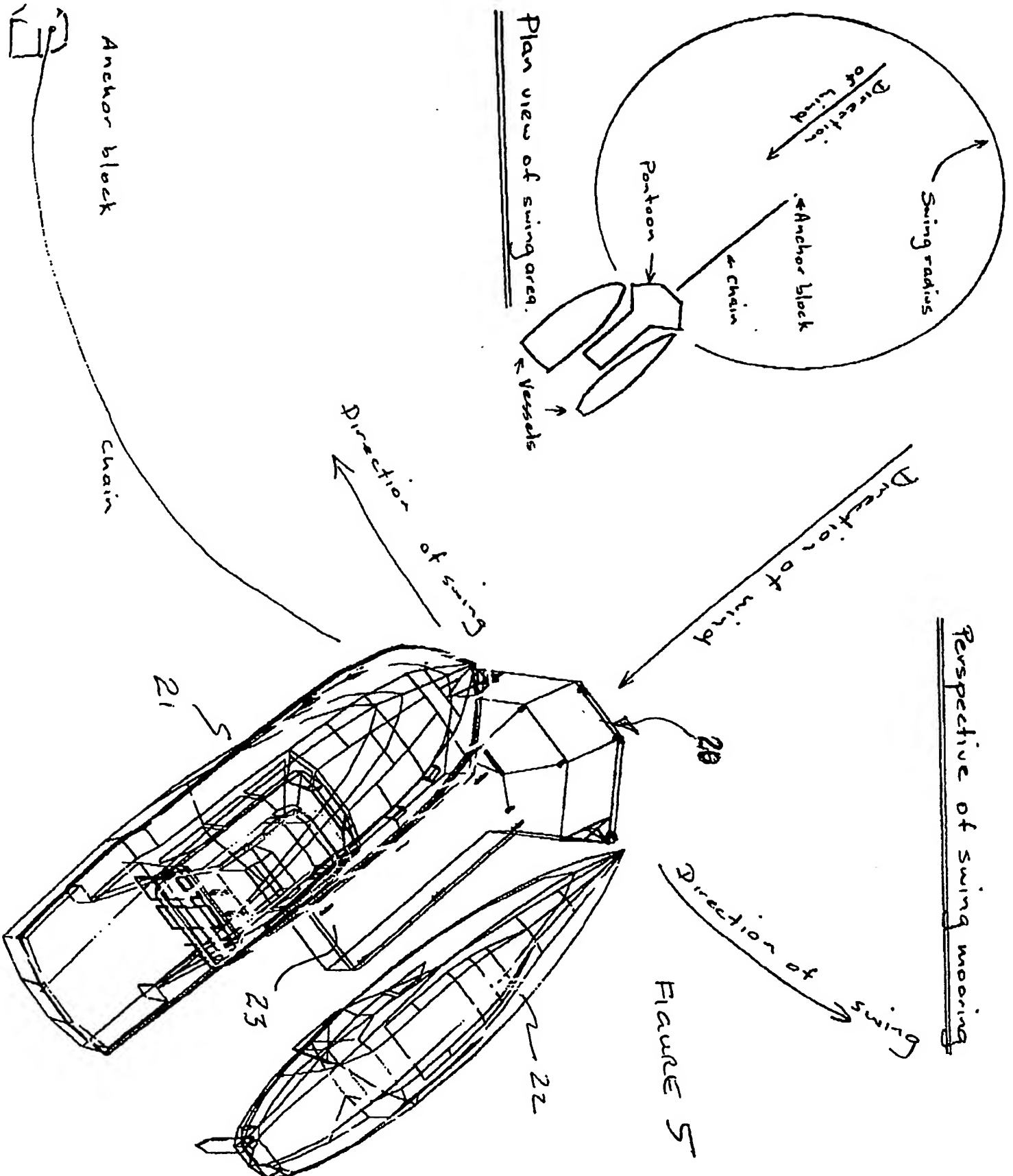


Fig 4

END VIEW
SWING MOORING PONTOON



SWING MOORING PONTON

Showing Spreader Plate
and Straps (webbing) attached
to underside of SMP.

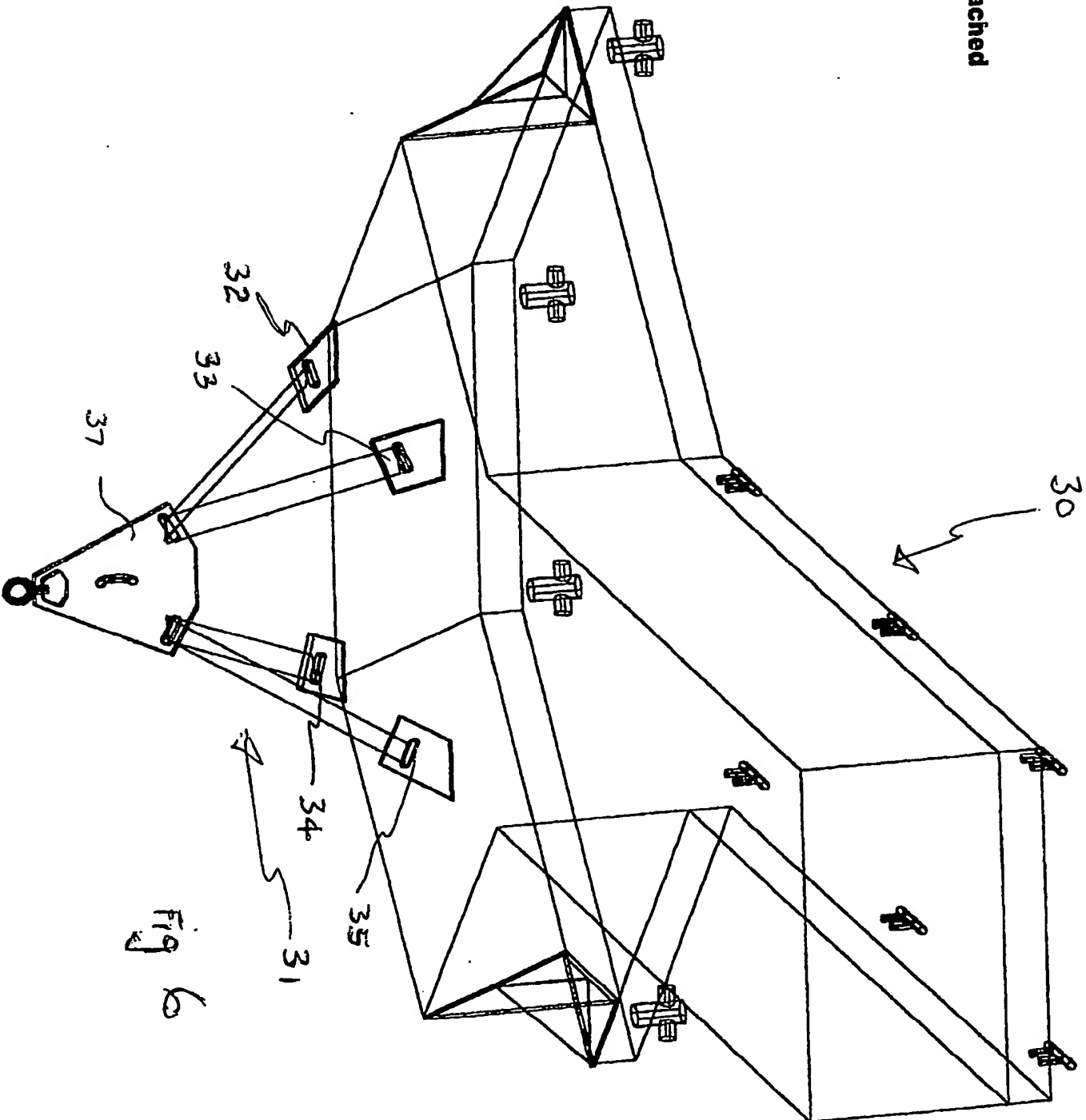
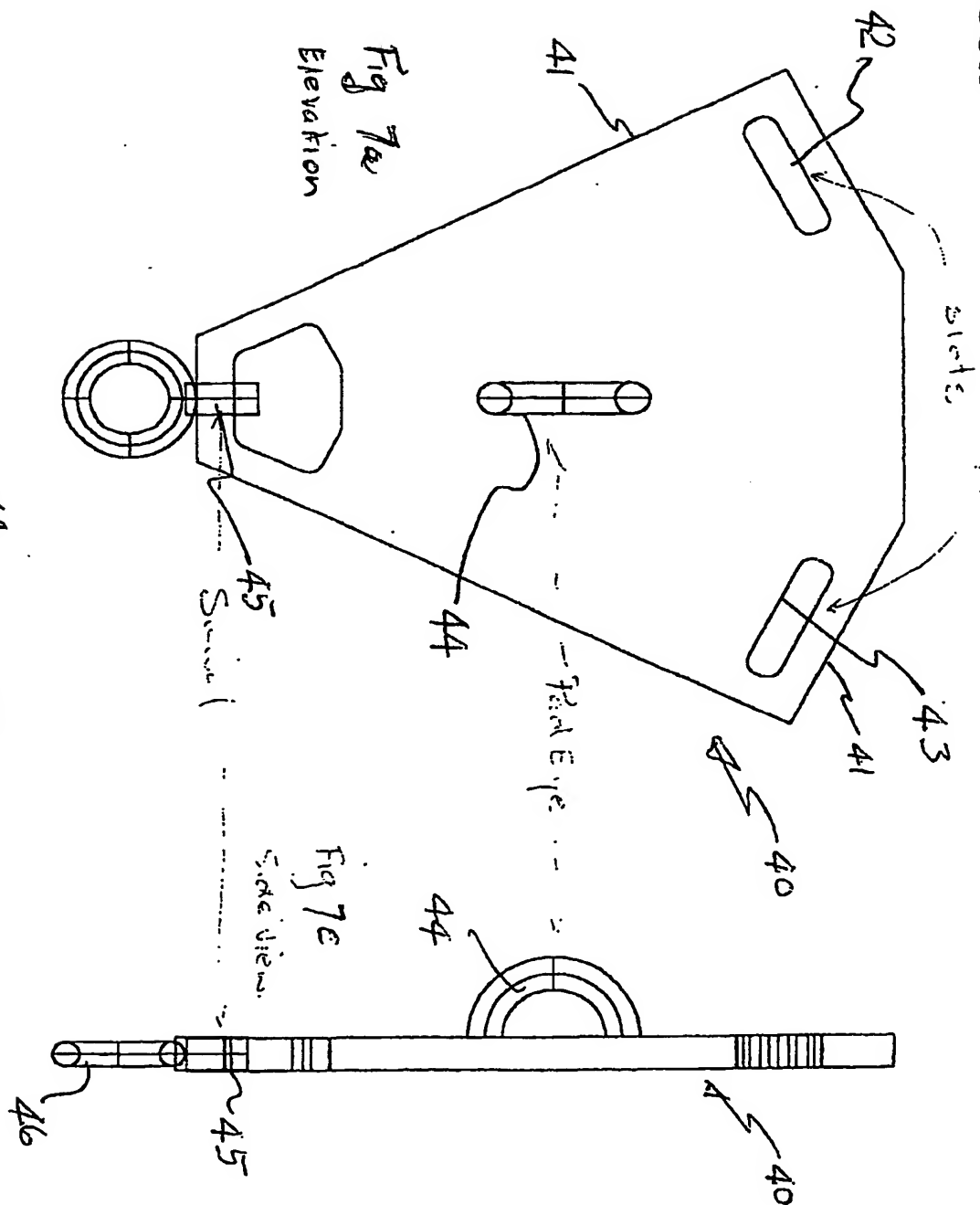


Fig 6

SPREADER PLATE for SWING MOORING PONTON



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Fig 12

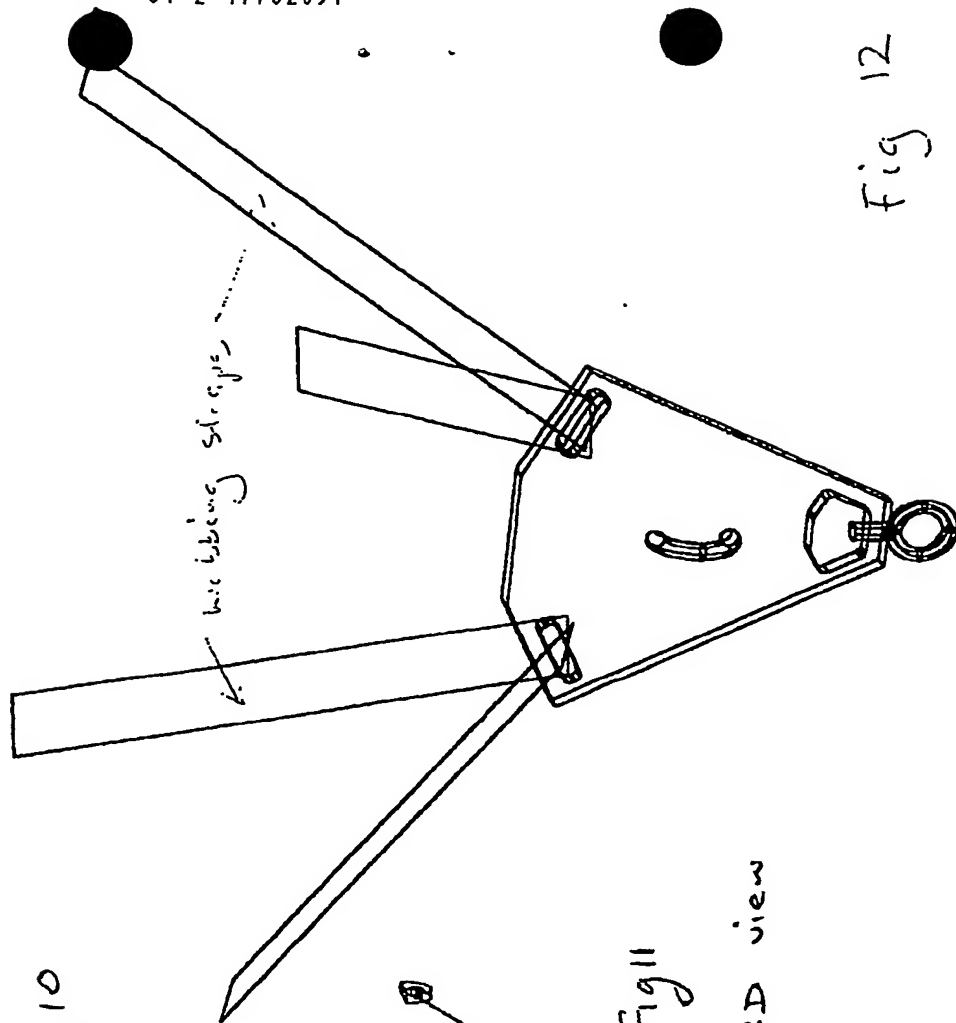
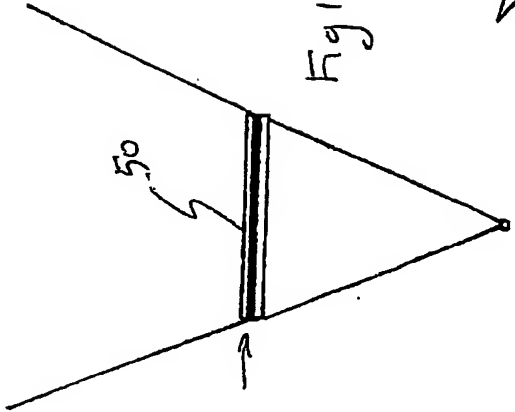
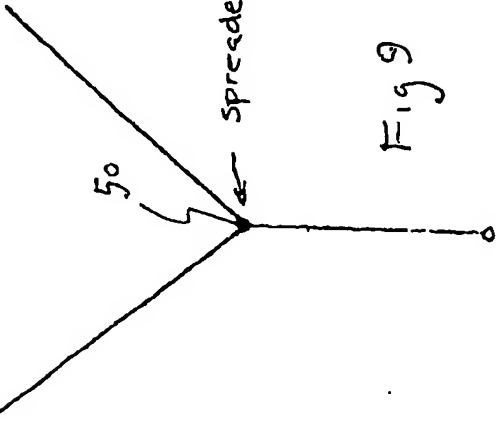


Fig 10



Front view

Fig 9



End view

Fig 11

3D view

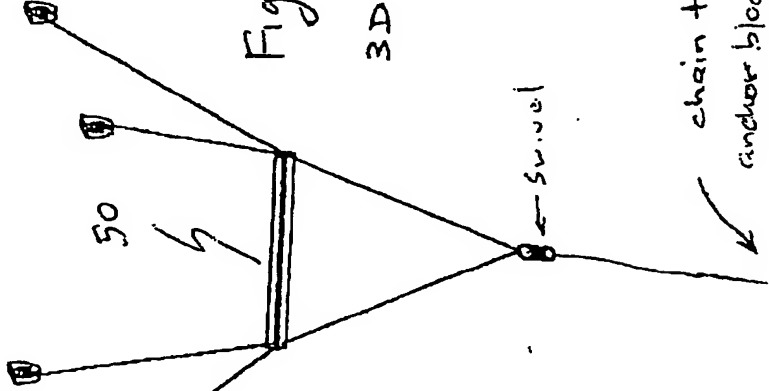
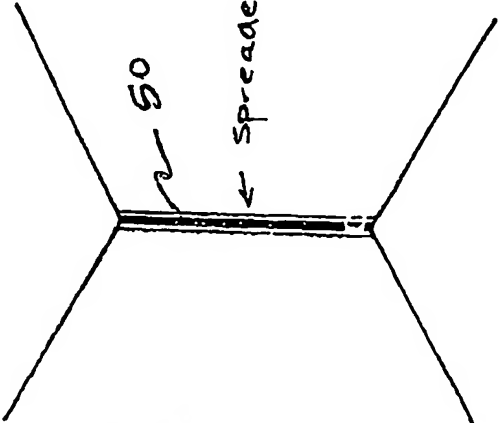


Fig 8



Plan view

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